

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF COMMERCIAL FISHERIES

CALIFORNIA FISHERY MARKET NEWS MONTHLY SUMMARY

March 1963

Part II—Fishing Information*

Sea-surface temperatures, fishing and research information
of interest to the West Coast tuna-fishing industry
and marine scientists

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COOPERATIVE BLUEFIN TUNA TAGGING PROGRAM - A PRELIMINARY REPORT

Introduction

The bluefin tuna, Thunnus thynnus (Linnaeus),^{1/} has supported a purse seine fishery in California since 1919. Through the years, bluefin landings from the eastern North Pacific fishery have fluctuated from a low of 560,492 pounds in 1933 to a high of 31,846,455 pounds in 1962. One of many factors influencing these wide fluctuations in landings is availability; availability, in turn, is a function of the annual movements of the species off the Pacific coast.

The year 1962 signalled heightened interest in the bluefin fishery. As yellowfin landings declined during the spring-summer period, almost all of the high-seas fleet made at least one bluefin trip to the local fishing banks. As a consequence, fishing effort increased severalfold over the previous years of record.

In recognition of the increased dependence upon bluefin by the California-based tuna fleet, the U.S. Bureau of Commercial Fisheries and the California Department of Fish and Game have started a cooperative long-range bluefin tuna-tagging program to learn more about the movements of bluefin in the North Pacific Ocean.

The only previous tagging experiments on bluefin tuna were performed in 1953 and 1958. Three bluefin were tagged by California Department of Fish and Game personnel during an albacore tagging expedition to Guadalupe Island in August, 1953. Subsequently, one of these fish was recaptured in the same locality about 5 months later (Roedel, 1954).

One hundred and twenty-one bluefin were marked with yellow plastic loop tags and were released from M/V Columbia near Guadalupe Island between February 2 and 19, 1958 by scientists of the Inter-American Tropical Tuna Commission. At the time, Columbia was proceeding south on a trip scheduled for tagging yellowfin and skipjack in the Revilla Gigedo Islands region. Subsequently, eight tags were returned from the same region up to 200 days after release: two were reported from Cedros Island; two were returned from Guadalupe Island; and three came from the vicinity of San Clemente Island. One tag was "found in cannery" (Chatwin and Orange, 1960). Since August, 1958, no other bluefin tags have been recovered.

^{1/} The present nomenclature has priority over T. saliens, Jordan and Evermann. See FAO World Scientific Meeting on the Biology of Tunas and Related Species, Provisional Report, July 14, 1962, p.95 (Processed).

1962 Tagging Operations

The first of a series of annual tagging cruises was undertaken in August, 1962, aboard the purse seiner West Point, operating under charter to the U.S. Bureau of Commercial Fisheries. The California Department of Fish and Game provided the yellow dart-type spaghetti tags (manufactured in accordance with specifications supplied through the courtesy of the Inter-American Tropical Tuna Commission) and other necessary equipment. The writers were assisted by West Point crew members in the actual tagging operations.

West Point first encountered bluefin tuna on August 13, 1962, near the 176-fathom spot (29°40' N., 117°20' W.). Seven successful sets were made subsequently between the 176-fathom spot and San Clemente Island; the last release was made on August 23, just before the vessel returned to port (table 1). During this interval, West Point fished in close proximity to the tuna fleet. On the morning of August 14, 12 vessels were sighted. On August 21, about 20-30 vessels were fishing a small area off the west end of San Clemente Island. At no time during the ten-day interval did West Point operate without sighting one or more purse seiners during each day.

Unlike tagging operations aboard bait-boats or jig-boats employing hook and line, the purse seine method severely limits the number of tuna which can be tagged and released in good condition from a single school. Once a school is encircled by the net and the purse line is drawn, the fish are subjected to holding times varying from 45 minutes to several hours, depending upon the size of the school. During the holding interval, the condition of the fish is contingent upon many factors, and survival seems to be directly dependent on: catch size; size of fish; prevailing light conditions; character of sea and swell; and whether or not the seine fouls during hauling operations.

Tagging operations aboard West Point were terminated at the first sign of sluggishness after fish were released. No fish were released that exhibited skin lacerations or signs of hemorrhaging; however, almost all fish displayed net marks (red areas on snout, loss of scales, frayed dorsal and caudal fins) to some degree. Few bluefin survived the purse seine operation without sustaining minor external injuries of some kind.

Because length of tagging time was critical, no attempt was made to record the length or weight of each tagged fish. Length measurements were taken from a sample of 50 fish after tagging operations were terminated and loading commenced. These length data served only as approximations of size.

Table 1.--Release and recovery data for 960 bluefin tuna tagged aboard M/V West Point, August 13-23, 1962.

Release number and location	Date	Time (PST) ^{1/}	Sea tempera- ture (°F)	Number of fish		Percent recovered	Time at liberty (days)		Distance travelled (miles)	
				Tagged	Recovered		Maximum	Minimum	Maximum	Average
1 (29°43'N., 117°20'W.)	August 13	1620-1705	67.0	75	9	12.0	27	2	160	1
2 (29°43'N., 117°20'W.)	August 14	1510-1545	67.0	68	1	1.5	-	-	-	-
3 (29°43'N., 117°20'W.)	August 14	1850-1930	67.0	109	1	0.9	-	-	-	-
4 (30°10'N., 117°05'W.)	August 15	2000-2100	66.5	285	4	1.4	57	3	73	47
5 (30°10'N., 117°05'W.)	August 16	1500-1530	68.0	16	0	0.0	-	-	-	-
6 (33°02'N., 119°01'W.)	August 21	1705-1810	66.5	296	41	13.9	48	1	72	0
7 (32°36'N., 118°06'W.)	August 23	1040-1110	67.5	111	28	25.2	25	1	76	1
Totals	--	--	--	960	84	8.8	57	1	160	0
										26.7

^{1/}Times at start and end of tagging operation, Pacific Standard Time (PST).

^{2/}Computed on basis of 40 returns; data incomplete for 1 tag return.

Preliminary Return Data

Eighty-four tags were returned in the period ending on January 1, 1963. These returns represented recovery of 8.8 percent of the total number of fish released (table 1). Among the seven individual groups of tagged fish released, recovery percentages varied from zero to 25.3 percent. The first release group yielded a 12 percent recovery of fish which were at liberty an average of 8.7 days and which had travelled an average distance of 61.9 miles (table 1). One bluefin in this group moved about 160 miles and was at liberty 27 days. Releases 2 through 5 yielded few returns, but release groups 6 and 7 provided the bulk of all tags recovered. Average times at liberty and distances travelled for the latter two groups were 8.8 and 7.5 days, and 27.6 and 10.8 miles, respectively.

The two highest recovery percentages from sets number 6 and 7 suggest rather heavy fishing pressure on the available segment of the eastern North Pacific bluefin population in August-September, 1962. Vessel log records from M/V Paramount showed that three tagged bluefin released at the 43-fathom spot (30°10' N., 118°05' W.) between 1040 and 1110 PST, August 23, 1962, were recovered the same day in a single set about 6 miles away at 1310-1420 PST, some 2 hours after release. Altogether, 15 tagged bluefin were recovered on the same day of release from set number 7.

Although most of the tag recoveries indicated relatively short times at liberty and correspondingly small distances travelled, a few returns provide some insight into the summer pattern of bluefin movement off southern California and Baja California. Two fish tagged at the southernmost location on August 13, 1962, were recovered near San Clemente Island on September 7 and 8 respectively, and one bluefin tagged on August 14 at 30°10' N., 117°05' W. was recovered just west of the southern tip of Guadalupe Island on October 10 (figure 1). These recoveries suggest that a general northward movement took place in late August and early September, followed by a southern exodus past Guadalupe Island in early October.

The bluefin tuna-tagging program will be continued in 1963. Expectations are to increase the number of tags released so that return information will be improved. The accumulation of tag return data will do much to increase our knowledge of the life habits of the bluefin in the eastern North Pacific Ocean.

Literature Cited

- Chatwin, Bruce M., and Craig J. Orange
1960. Recovery of tagged bluefin tuna (Thunnus saliens). Calif. Fish and Game, vol. 46, no. 1, pp. 107-109.

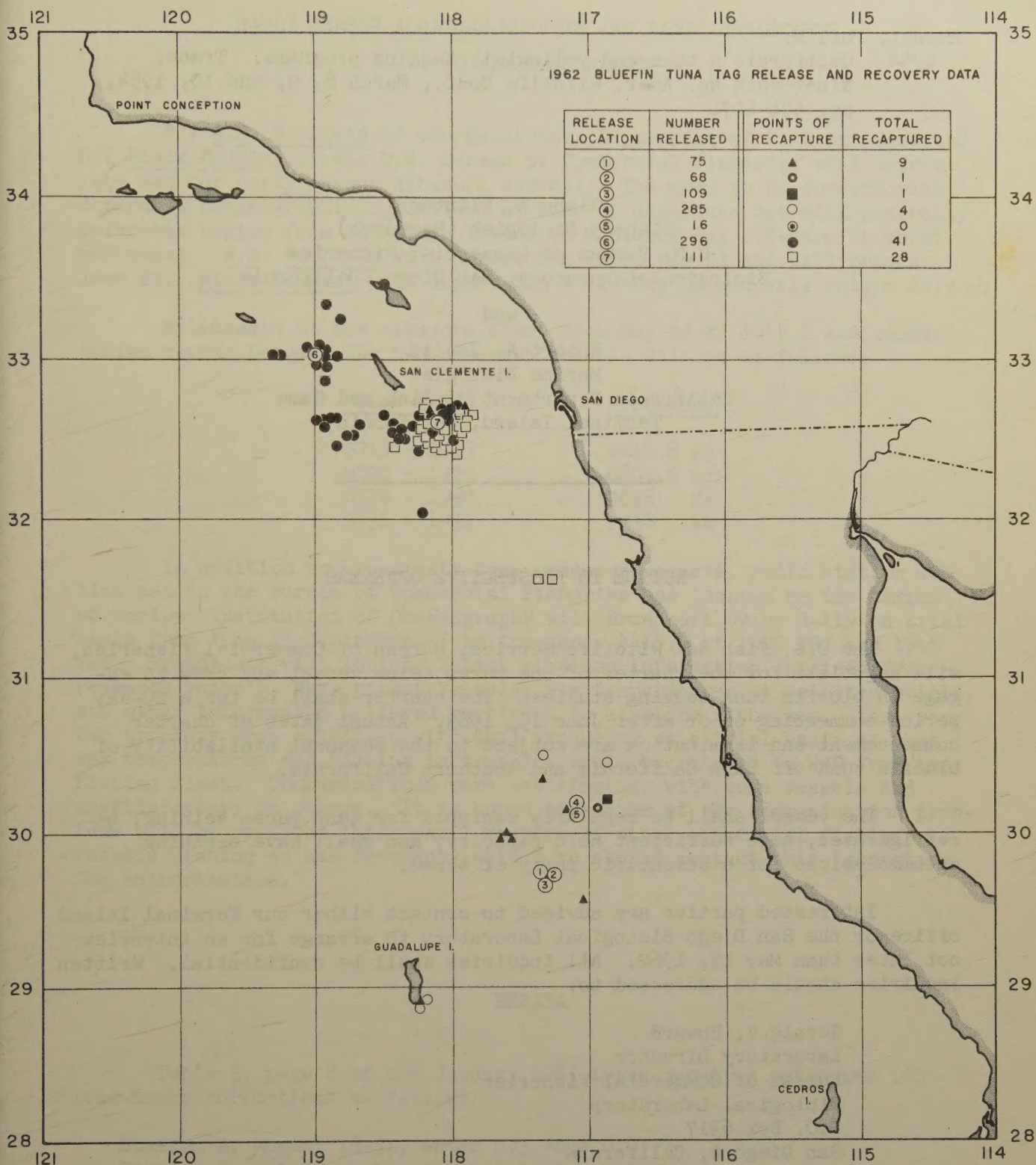


Figure 1.--Dispersal of bluefin tuna tagged and released August 13-23, 1962, off the California-Baja California coast. (Tag returns summarized to January 1, 1963.)

Roedel, Phil M.

1954. California's tuna and yellowtail tagging programs. Trans.
Nineteenth No. Amer. Wildlife Conf., March 8, 9, and 10, 1954,
pp. 404-417.

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NOTICE TO PROSPECTIVE OFFERERS

The U.S. Fish and Wildlife Service, Bureau of Commercial Fisheries, will negotiate for the charter of one purse seine vessel and crew to engage in bluefin tuna tagging studies. The charter shall be for a 20-day period commencing on or after June 15, 1963. Actual dates of charter commencement and termination are subject to the seasonal availability of bluefin tuna off Baja California and southern California.

The vessel shall be regularly equipped for tuna purse seining, be refrigerated, have sufficient hold capacity, and shall have berthing accommodations for a scientific party of three.

Interested parties are advised to contact either our Terminal Island office or the San Diego Biological Laboratory to arrange for an interview not later than May 15, 1962. All inquiries shall be confidential. Written inquiries should be addressed to:

Gerald V. Howard
Laboratory Director
Bureau of Commercial Fisheries
Biological Laboratory
P.O. Box 6317
San Diego 6, California

EARLY SEASON ALBACORE SURVEYS AND RADIO BROADCASTS

TO ALBACORE FLEET

R/V N.B. Scofield of the California Department of Fish and Game and R/V Black Douglas of the U.S. Bureau of Commercial Fisheries will depart late May for early season albacore surveys. The area to be covered will depend on oceanographic conditions at time of departure but will generally cover the region from Guadalupe Island to Monterey Bay offshore to about 600 miles. N.B. Scofield will depart San Pedro May 23 and will return June 21. Black Douglas will depart San Diego May 28 and will return July 2.

Broadcasts to the albacore fleet from May 23 to July 2 and communication checks between the two research vessels will be as follows:

<u>Time (PST)</u>	<u>Frequency</u>
0915 - 1915	4415.8 kc
0920 - 1920	8805.6 kc
0930 - 1930	2638 kc
0935 - 1935	2738 kc

In addition to broadcasts from research vessels, radio station WWD licensed to the Bureau of Commercial Fisheries and located on the campus of Scripps Institution of Oceanography will broadcast twice daily on trial basis from June 15-September 15 on frequency 4415.8 at 1000 PST and 1945 PST. Broadcasts will include latest albacore information obtained from research vessels, Navy picket vessels, sea temperatures at selected points, and other information believed pertinent to albacore fishermen. Last year ten trollers were outfitted with this frequency on a trial basis so that sea temperatures and fishing information could be relayed to WWD from the fishing fleet. Communications were satisfactory with some vessels and unsatisfactory on others. It is hoped that some of the communication problems will be resolved this year. Masters of other commercial fishing vessels wishing to use frequency 4415.8 kc should contact this laboratory for authorization.

ERRATA

Table 3, page 8 of the January 1963 issue requires catch per 100 line-hours corrections as follows:

Station 2, August 16-31, enter 0.3 vice 0.0
 Station 2, October 1-15, enter 0.1 vice 0.2
 Station 5, June 16-30, enter 2.1 vice 3.2

SEA SURFACE TEMPERATURE CHARTS, EASTERN PACIFIC OCEAN

MARCH 1963

Acknowledgments

The following organizations and stations contributed data for the March 1963 charts:

U.S. Weather Bureau, San Diego, California
U.S. Weather Bureau Ship Visitation Office, Long Beach,
California
U.S. Naval Communication Station Balboa, Fort Amador,
Canal Zone
U.S. Coast Guard, Port Hueneme Light Station, Port Hueneme,
California
U.S. Bureau of Commercial Fisheries, Biological Laboratories,
Honolulu, Hawaii; La Jolla, California; Seattle,
Washington
U.S. Bureau of Commercial Fisheries, Exploratory Fishing and
Gear Research Base, Seattle, Washington
California Department of Fish and Game, R/V N.B. Scofield
Guadalupe Island, Coronado Island, Ensenada, Cedros Island
and Almejas Bay by Pedro Mercado of the Universidad
Autonoma de Baja California, Ensenada, Mexico
Hopkins Marine Station, Pacific Grove, California by
J. P. Balesteri
Inter-American Geodetic Survey by Rene Cortes at Salina Cruz,
Mexico; David Ortega at Manzanillo, Mexico;
Romeo Valencia at Pt. San Jose, Guatemala; D. Reyes
at Pt. Armuelles, Panama; V. E. Castillo at Tumaco,
Colombia; S. Zambrano at San Cristobal, Galapagos;
N. Valenzuela at La Libertad, Ecuador; T. Torres at
Talara, Peru
Inter-American Tropical Tuna Commission, La Jolla and
Terminal Island, California
Kelco Company, San Diego, California
Oregon State College
Pacific Oceanographic Group, Nanaimo, British Columbia,
by H. J. Hollister from observations by R. W. Collins
at Quatsino Lightstation; G. J. Skinner at Cape St.
James Light; B. Stuart at Amphitrite Point Light;
J. M. Hartt at Langara Island Light
Scripps Institution of Oceanography, La Jolla, California
by Margaret Robinson and Hans Klein
Ships Bonnie and Santa Maria

Charts

Figure 1.--Mean sea surface temperatures ($^{\circ}\text{F}$) derived from approximately 8000 observations. Squares show temperatures at weather-ship stations. Numerals on shore are temperatures at coastal and light stations.

Figure 2.--Deviation of sea surface temperatures ($^{\circ}\text{F}$) from long term mean charts of H.O. 225. Hatched areas are colder than mean.

Figure 3.--Deviation of sea surface temperatures ($^{\circ}\text{F}$) from those of March 1962. Hatched areas are colder than 1962.

Figure 4.--Sea surface temperatures ($^{\circ}\text{F}$) by 1-degree squares, approximately 2000 observations. Line under temperatures indicates average of two or more observations. Numerals on shore are temperatures at coastal and light stations.

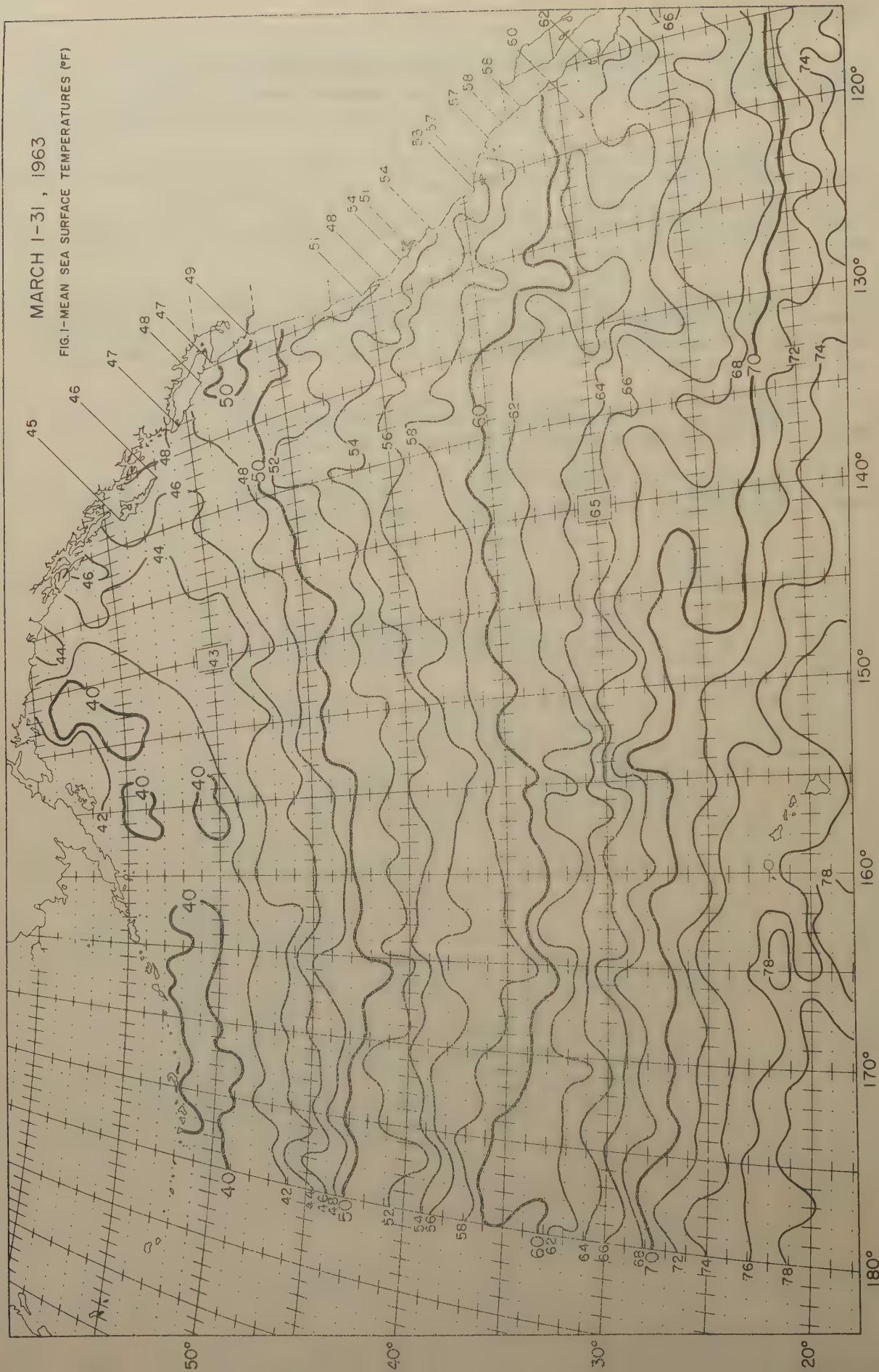
Figure 5.--Deviation of sea surface temperatures ($^{\circ}\text{F}$) March 1963 - March 1962 by 1-degree squares. Shaded areas colder in 1963.

Figure 6.--Deviation of sea surface temperatures ($^{\circ}\text{F}$) from 12-year mean (1947-1958) by 2-degree squares. Shaded areas colder in 1963.

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Fishery Biologist (General)

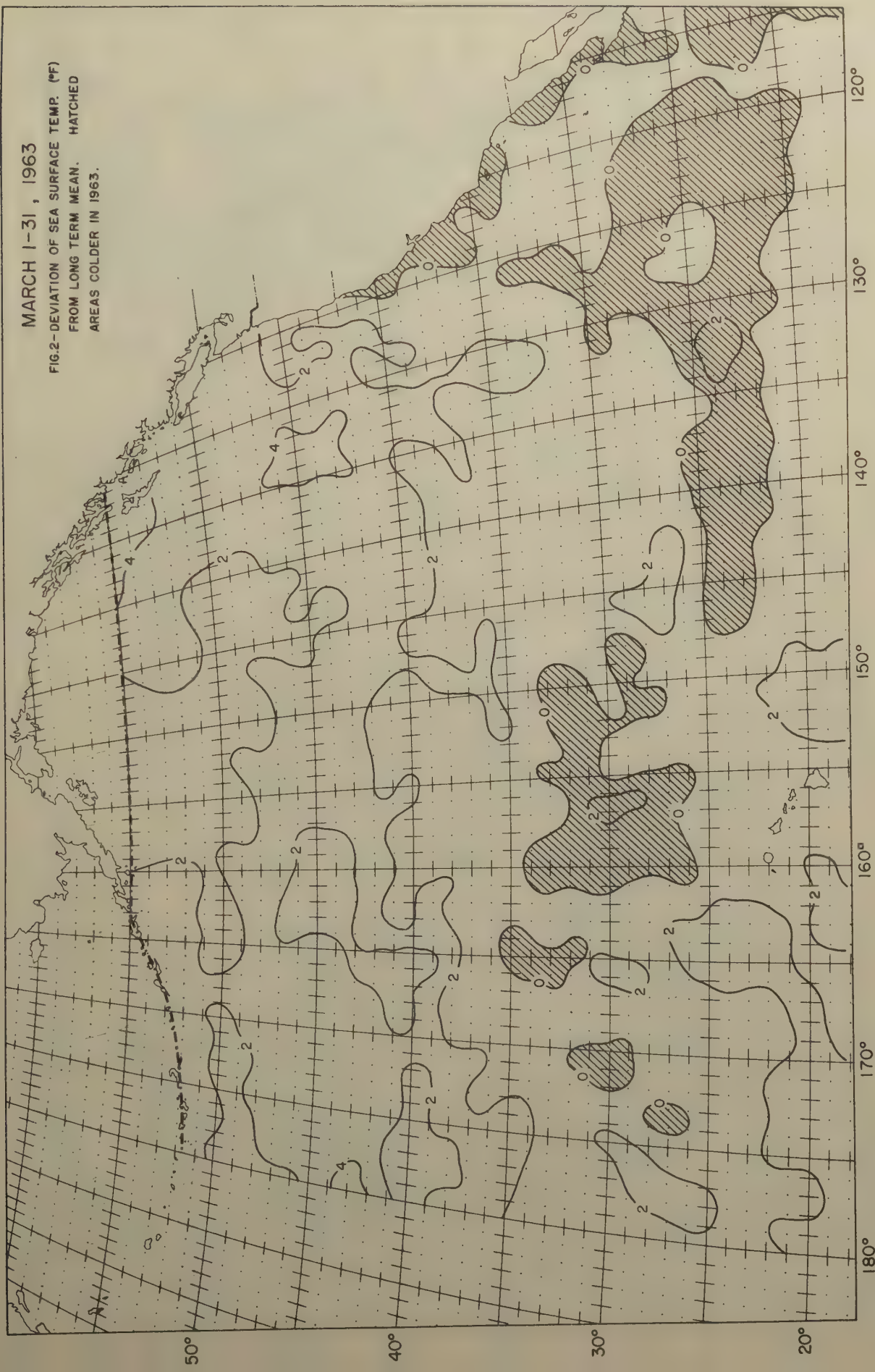
MARCH 1-31, 1963

FIG. 1-MEAN SEA SURFACE TEMPERATURES (°F)



MARCH 1-31, 1963

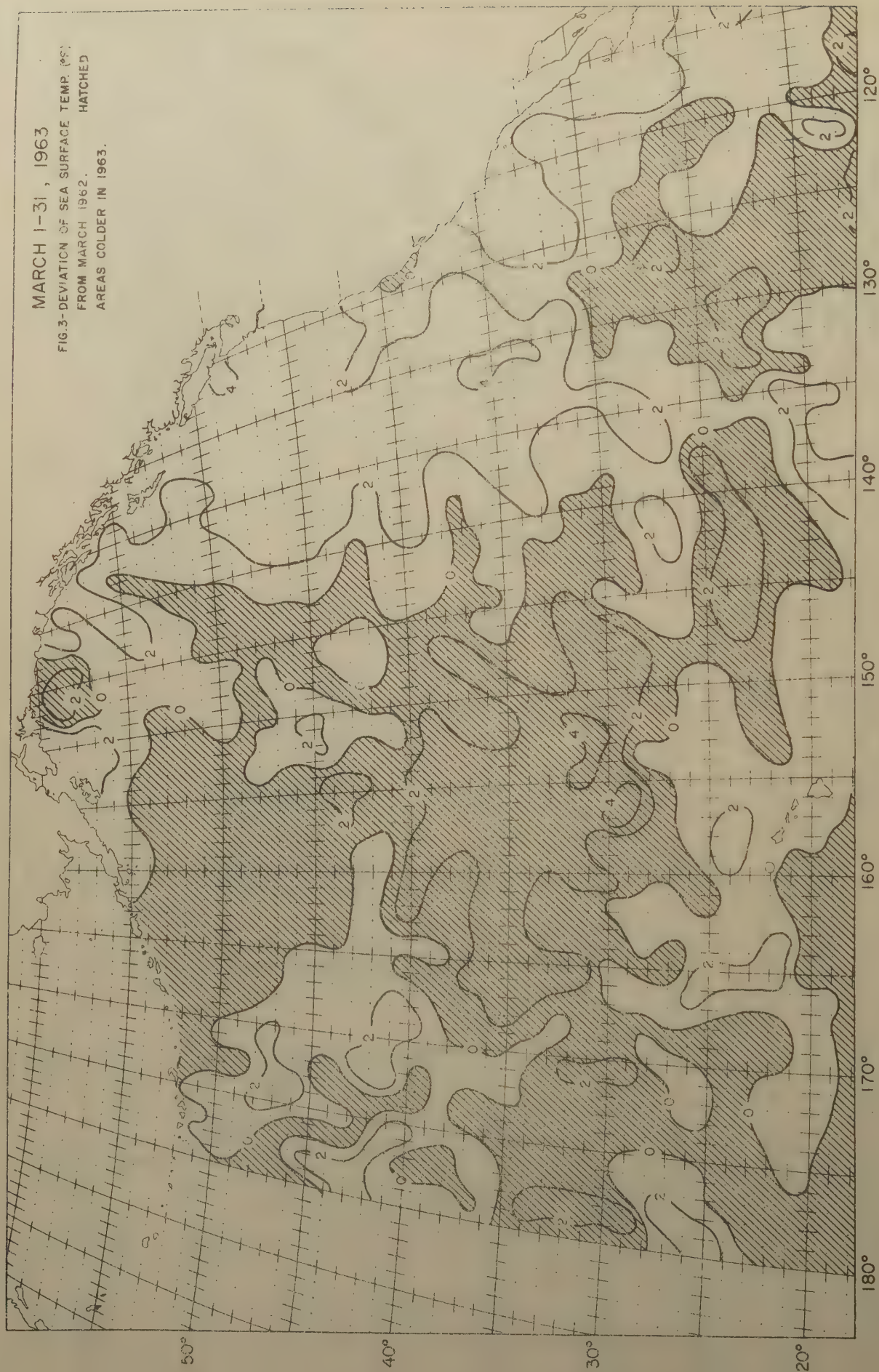
FIG.2- DEVIATION OF SEA SURFACE TEMP. (°F)
FROM LONG TERM MEAN. HATCHED
AREAS COLDER IN 1963.



MARCH 1-31, 1963

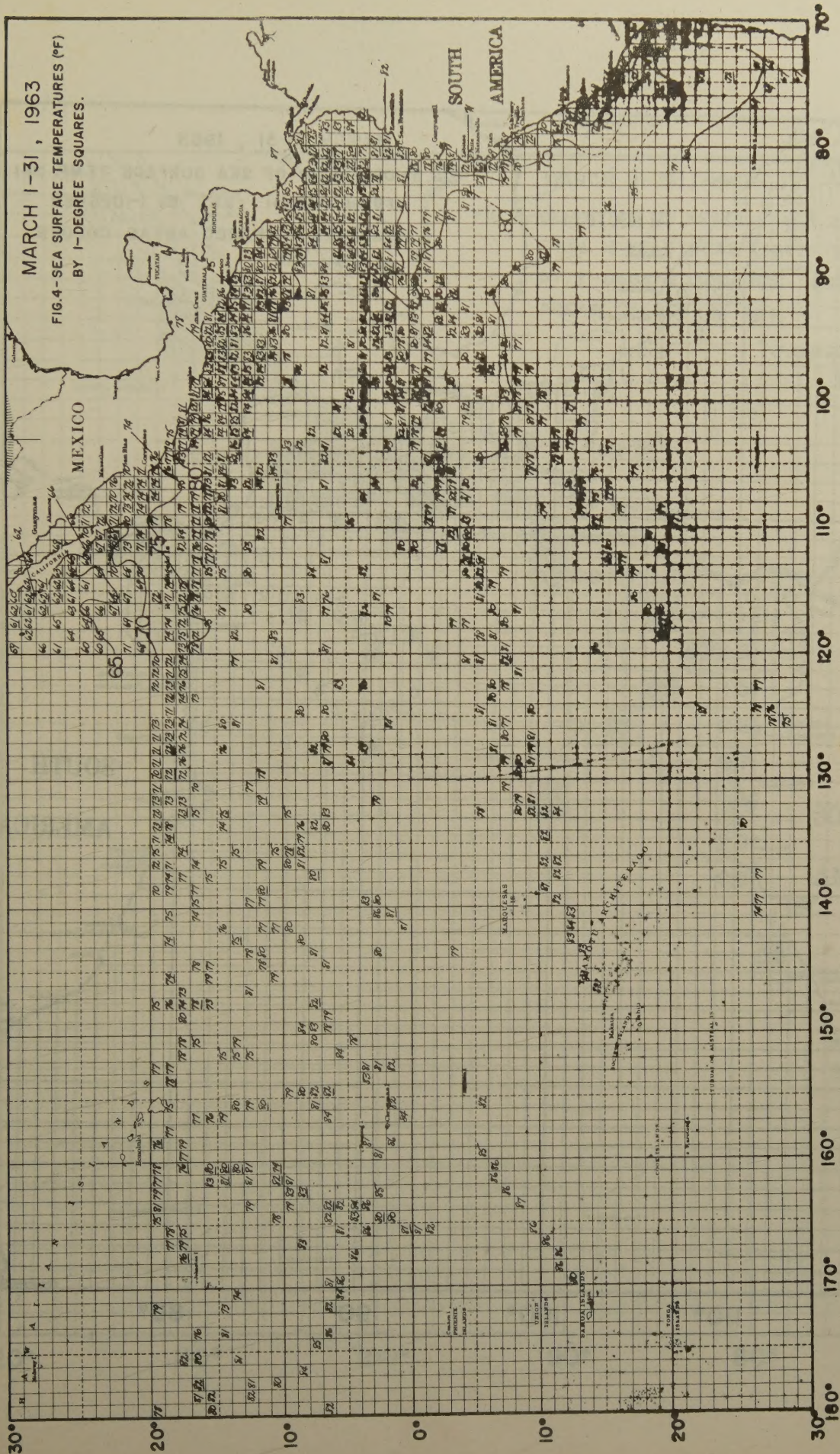
FIG. 3-DEVIATION OF SEA SURFACE TEMP. ($^{\circ}\text{F}$)
FROM MARCH 1962.

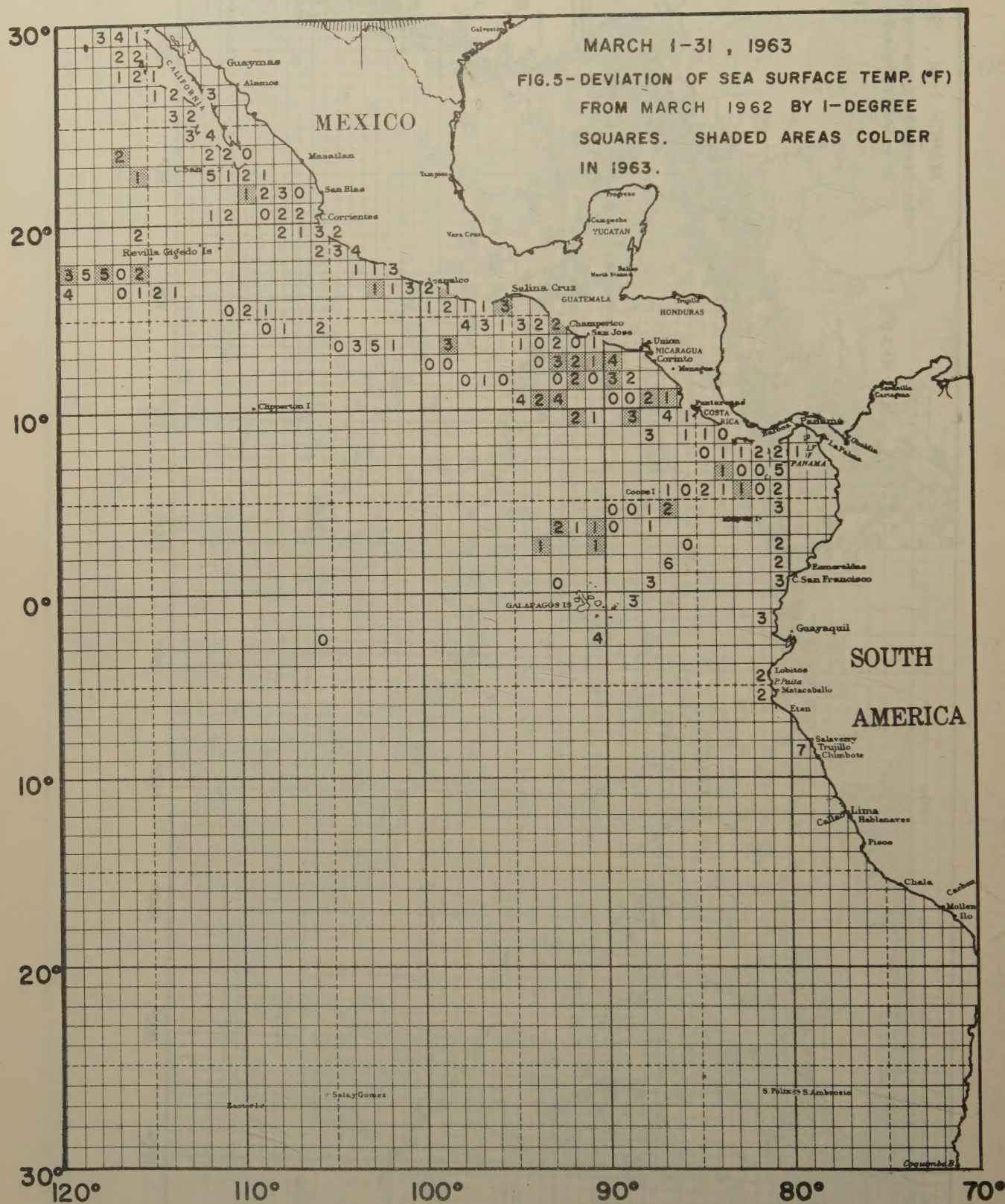
AREAS COLDER IN 1963.

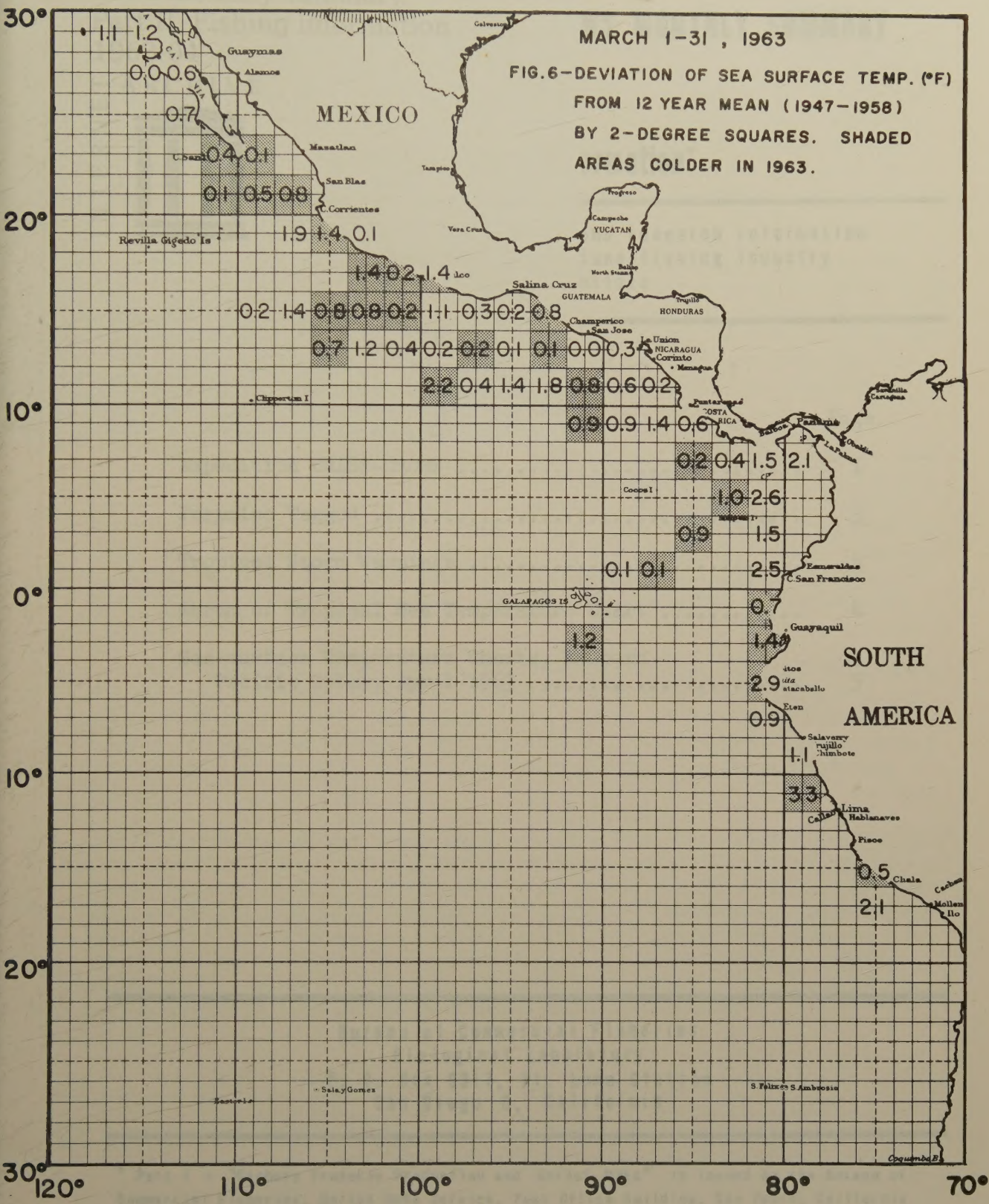


MARCH 1-31, 1963

FIG. 4 - SEA SURFACE TEMPERATURES (°F)
BY 1-DEGREE SQUARES.







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FIG.6-DEVIATION OF SEA SURFACE TEMP. (°F)
FROM 12 YEAR MEAN (1947-1958)
BY 2-DEGREE SQUARES. SHADED
AREAS COLDER IN 1963.

